PATENT ABSTRACTS OF JAPAN

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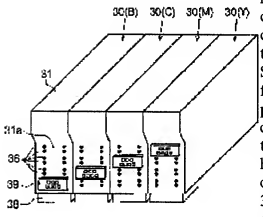
(54) INK CARTRIDGE AND INK JET RECORDER



(57)Abstract:

PROBLEM TO BE SOLVED: To provide an ink cartridge of simple structure and an ink jet recorder in which erroneous mounting of the ink cartridge can be determined easily and surely and cost reduction is promoted by making common the components.

SOLUTION: A circuit board 39 is fixed to the front face 31a of an ink cartridge 30 at different positions for different kinds of ink in the ink cartridge 30. A connection mechanism 29 is made through the wall part 22b of an ink cartridge holder 22 at different positions for different kinds of ink. Erroneous mounting of the ink cartridge 30 is determined by detecting the relation of electrical connection between the circuit board 39 and the connection mechanism 29 at a control section 19 on the body side of an ink jet recorder 11.

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CLAIMS

[Claim(s)]
[Claim 1] The ink cartridge characterized by having the discernment means with which it is the ink cartridge two or more wearing of the desorption of is enabled to an ink jet type recording apparatus, and the class of ink was electrically identified according to the attaching position.
[Claim 2] The ink cartridge according to claim 1 characterized by the configuration of each attachment means being the same while an attachment means to attach said discernment means is formed in two or more locations.
[Claim 3] The configuration of the discernment means of each of said ink cartridge is an ink cartridge according to claim 1 or 2 characterized by being the same configuration.
[Claim 4] The case configuration of each of said ink cartridge is an ink cartridge given in either of claim 1 to claims 3 characterized by being the same configuration.
[Claim 5] Said discernment means is an ink cartridge given in either of claim 1 to claims 4 characterized by being the circuit board which has a storage element.
[Claim 6] The ink cartridge characterized by having a discernment means to discriminate the class of ink from the distinction means formed in the recording apparatus concerned electrically in a connectable location only when it is the ink cartridge two or more wearing of the desorption of is enabled and an ink jet type recording apparatus is equipped in the suitable stowed position in said recording apparatus.
[Claim 7] The ink jet type recording apparatus characterized by having a distinction means to distinguish the class of ink of an ink cartridge with which it was equipped from the attaching position of the discernment means which the ink cartridge with which the ink of each color was filled up is the ink jet type recording apparatus two or more wearing of the desorption of is enabled, and was formed in the ink cartridge.
[Claim 8] Said distinction means is an ink jet type recording device according to claim 7 characterized by being beforehand prepared in the location which changes with classes of ink of an ink cartridge with which it is equipped, and distinguishing the class of ink according to engagement relation with said discernment means.
[Claim 9] It is the ink jet type recording device according to claim 8 characterized by said distinction means distinguishing the class of ink from an electrical installation condition with the circuit board concerned while said discernment means is the circuit board which has a storage element.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention is concerned with an ink cartridge and an ink jet type recording device.
[0002]
[Description of the Prior Art] Conventionally, in the ink jet type recording apparatus which records using the ink of two or more colors, what equipped with two or more ink cartridges with which the ink of each color was filled up according to the individual, respectively possible [desorption] is known. In this ink jet type recording apparatus, since it becomes exchangeable [a specific ink cartridge] according to the operating frequency of ink, ink can be exhausted without futility for every color, and it has the description of excelling in economical efficiency.
[0003] the ink supply path which consists of ink flow ways between the ink supply needles, ink supply needles, and ink heads which lead ink from an ink cartridge etc. in such an ink jet type recording apparatus -- each color -- it is prepared individually. Moreover, by equipping with an ink cartridge the ink cartridge applied part which the stowed position is beforehand defined for every class of ink, and was able to define each ink cartridge beforehand, the ink of each color is constituted so that an ink head may be supplied via the ink supply path of a proper, respectively.
[0004] And in the control section by the side of the body of an ink jet type recording device etc., by performing printing control of the ink regurgitation in an ink head etc. for every color, it is constituted so that color printing may be realized. Therefore, it is necessary to equip with each ink cartridge suitable for the predetermined stowed position which was able to be defined for every color, respectively in the cases, such as exchange of an ink cartridge.
[0005] As an ink jet type recording apparatus which has the incorrect wearing prevention means of such an ink cartridge, while preparing concave heights in the wall of an ink cartridge applied part in JP,4-185355,A, the ink jet type recording apparatus which prepared concave heights in the outer wall of each ink cartridge so that it might correspond to this is indicated. In this ink jet type recording apparatus, incorrect wearing of an ink cartridge can be prevented now by making the configuration of concave heights different for every ink cartridge based on the class of ink with which it fills up.
[0006]
[Problem(s) to be Solved by the Invention] However, in an incorrect wearing prevention means which is indicated in above-mentioned JP,4-185355,A, there was a problem of being disadvantageous inconvenience when the ink cartridge case where it has a different configuration for every class of ink is needed, communalization of a component part cannot be attained but a cost cut is aimed at.
[0007] Moreover, by preventing the incorrect insertion to the ink cartridge applied part of an ink cartridge, the above-mentioned incorrect wearing prevention means prevents incorrect wearing, and does not identify incorrect wearing in the wearing condition of an ink cartridge. Therefore, for example, when the configuration of the concave heights in each ink cartridge is a difference of some configurations, it may be equipped

compulsorily. And since a check of the incorrect wearing is what is depended on visual inspection, a mistake may produce it in the case of the visual inspection. Furthermore, a visual inspection activity is not made certainly, but when incorrect-equipped, a printing result (printed matter) will be checked and it can be identified by judging whether suitable color printing was realized whether it was incorrect wearing for the first time. In such a case, an ink supply path will be polluted by incorrect wearing of an ink cartridge in the ink of other colors, and there was a problem that the washing took time and effort.
[0008] These problems can respond by forming or securing dimensional accuracy between the configuration of the concave heights of an ink cartridge applied part, and the configuration of the concave heights of an ink cartridge so that it may become a configuration which is different for every class of ink in the configuration of the concave heights of an ink cartridge. However, if it does in this way, like the above as a result, a configuration will become complicated and it will become disadvantageously inconvenient, when communalization of a component part cannot be attained but a cost cut is aimed at.
[0009] This invention is to offer the simple ink cartridge and ink jet type recording device of a configuration of it having been made in view of the above-mentioned problem, and could identify incorrect wearing of an ink cartridge easily [the purpose] and certainly, and having attained communalization of a component part, and having promoted cheap-ization.
[0010]
[Means for Solving the Problem] In order to solve the above-mentioned trouble, invention according to claim 1 is an ink cartridge two or more wearing of the desorption of is enabled to an ink jet type recording apparatus, and is characterized by having the discernment means with which the class of ink was electrically identified according to the attaching position.
[0011] Thus, as compared with the incorrect wearing discernment approach by the conventional visual inspection activity, the class of ink can be identified now easily and certainly with a simple configuration by establishing the discernment means with which the class of ink was electrically identified by the ink cartridge according to the attaching position.
[0012] In an ink cartridge according to claim 1, invention according to claim 2 is characterized by the configuration of each attachment means being the same while an attachment means to attach said discernment means is formed in two or more locations.
[0013] Thus, if constituted, the attachment means of a specific location is chosen as arbitration from the attachment means formed in two or more locations of an ink cartridge, since it cannot be concerned with the attaching position but a discernment means can be attached in each ink cartridge by the same approach, the communalization like the shipfitter of the discernment means in a production line can be attained, and, thereby, cheap-ization can be promoted.
[0014] Invention according to claim 3 is characterized by the configuration of the discernment means of each of said ink cartridge being the same configuration in an ink cartridge according to claim 1 or 2.
[0015] If the configuration of the discernment means of each ink cartridge is made into the same configuration, a different discernment means for every class of ink and every ink cartridge is not needed, but communalization of the discernment means as a

component part can be attained. Thereby, communalization of a production line can be attained and cheap-ization can be promoted now.
[0016] Invention according to claim 4 is characterized by the case configuration of each of said ink cartridge being the same configuration in an ink cartridge given in either of claim 1 to claims 3.
[0017] If the case configuration of each ink cartridge is made into the same configuration, the ink cartridge which has a different configuration for every class of ink is not needed, but communalization of the case of the ink cartridge as a component part can be attained. Thereby, communalization of a production line can be attained and cheap-ization can be promoted now.
[0018] Invention according to claim 5 is characterized by said discernment means being the circuit board which has a storage element in an ink cartridge given in either of claim 1 to claims 4.
[0019] Thus, if constituted, a configuration can be made simpler by using the existing component parts, such as the circuit board which is used for other purposes, for example, has the storage element which made the information about an ink residue memorize.
[0020] Invention according to claim 6 is characterized by having a discernment means to discriminate the class of ink from the distinction means formed in the recording apparatus concerned electrically in a connectable location, only when it is the ink cartridge two or more wearing of the desorption of is enabled and an ink jet type recording apparatus is equipped in the suitable stowed position in said recording apparatus.
[0021] Thus, in order for a distinction means and a discernment means to connect electrically only when the suitable stowed position in a recording device is equipped with an ink cartridge if constituted, the class of ink can be identified easily and certainly by distinguishing this electrical installation condition. Thereby, as compared with the incorrect wearing discernment approach by the conventional visual inspection activity, the class of ink can be identified now easily and certainly with a simple configuration.
[0022] The ink cartridge with which the ink of each color was filled up is the ink jet type recording apparatus two or more wearing of the desorption of is enabled, and invention according to claim 7 is characterized by having a distinction means to distinguish the class of ink of an ink cartridge with which it was equipped from the attaching position of the discernment means formed in the ink cartridge.
[0023] Since the class of ink of an ink cartridge with which the body side of an ink jet type recording apparatus was equipped from the attaching position of the discernment means of an ink cartridge was distinguished, as compared with the incorrect wearing discernment approach by the conventional visual inspection activity, the class of ink can be identified easily and certainly with a simple configuration. And since the class of ink is discriminable in the wearing condition of an ink cartridge, unsuitable printing after incorrect wearing of an ink cartridge can be prevented beforehand.
[0024] In an ink jet type recording apparatus according to claim 7, said distinction means is beforehand formed in the location which changes with classes of ink of an ink cartridge with which it is equipped, and invention according to claim 8 is characterized by distinguishing the class of ink according to engagement relation with said discernment means.
[0025] In a distinction means, by distinguishing the class of ink according to engagement relation with a discernment means, the class of ink of an ink cartridge can be identified

now and discernment of the class of ink can be ensured [easily and] now by the body side of an ink jet type recording apparatus as compared with the incorrect wearing discernment approach by the conventional visual inspection activity.

[0026] While said discernment means is the circuit board in which invention according to claim 9 has a storage element in an ink jet type recording device according to claim 8, said distinction means is characterized by distinguishing the class of ink from an electrical installation condition with the circuit board concerned.

[0027] By distinguishing the class of ink from an electrical installation condition with a discernment means, it becomes possible to identify the class of ink more easily and certainly as compared with the incorrect wearing discernment approach by the conventional visual inspection activity. And a configuration can be made simpler by using the existing component parts, such as the circuit board which is used for other purposes, for example, has the storage element which made the information about an ink residue memorize.

[0028]

[Embodiment of the Invention] Hereafter, the first operation gestalt which materialized this invention is explained according to drawing 1 - drawing 7 .

[0029] As shown in <whole configuration> drawing 1 , the ink jet type recording apparatus 11 is equipped with the carriage which conveys a print sheet 12, and the carriage device in which it has carriage 21. The ink cartridge holder 22 with which carriage 21 is equipped with two or more ink cartridges 30 possible [desorption] is carried.

[0030] It consists of the paper feed roller 14, other rollers which are not illustrated which make the paper feed motor 13 and a platen roller serve a double purpose, and the paper feed roller 14 and other rollers which are not illustrated rotate by the drive of the paper feed motor 13, and carriage is constituted so that conveyance of a print sheet 12 may be performed.

[0031] A carriage device consists of timing belts 18 stretched between the shaft of said paper feed roller 14, and the guide member 15 constructed over parallel, the carriage motor 16 and the pulley 17 of a pair. And carriage 21 is constituted so that both-way sliding may be carried out by the drive of the carriage motor 16 in the paper width direction of a print sheet 12 on the guide member 15 through a timing belt 18.

[0032] As shown in drawing 2 , the controlling mechanism of this ink jet type recording device 11 is constituted considering RAM19b which stores temporarily ROM19a which stores the control section 19 as a distinction means which consists of a well-known CPU etc., various programs, etc., working data, etc. as a core. This controlling mechanism performs various kinds of control, such as motion control in the carriage and the carriage device which were mentioned above, and printing control in the printing mechanism mentioned later.

[0033] In a <ink cartridge> book operation gestalt, each ink cartridge 30 with which the ink cartridge holder 22 is equipped is not concerned with the class of ink with which it fills up, but takes the same configuration as abbreviation. Hereafter, the configuration of an ink cartridge 30 is explained in full detail.

[0034] As shown in drawing 3 and drawing 4 , an ink cartridge 30 consists of porous bodies 32 by which the appearance configuration is contained in the ink cartridge case 31 made of synthetic resin where it has an abbreviation rectangular parallelepiped

configuration as a whole, and its ink cartridge case 31. The lower part of front 31a of the ink cartridge case 31 is formed in a concave, and the pin 36 as an attachment means is installed in the crevice by two or more upper and lower sides side by side. And based on the class of ink with which it fills up, the pin 36 of arbitration is chosen as an object for immobilization of the circuit board 39, and it is equipped with the circuit board 39 as a discernment means by carrying out the heat caulking of the selected pin 36 so that it may mention later.

[0035] The circuit board 39 has the nonvolatile memory (EEPROM) which is not illustrated as a storage element holding the contents even if it can rewrite the contents of storage and supply of a power source is lost. Data, such as the ink color held in the ink cartridge 30, i.e., the class of ink and the amount of ink, the date of manufacture, and a part number, are stored in nonvolatile memory, and it is used for ink residue management of an ink cartridge 30 etc. And said nonvolatile memory connected with such contact 39a is mounted in a rear-face side, the mold of the whole is carried out by the charge of ink-proof lumber, and this circuit board 39 is made into the non-exposure while it has two or more contact 39a in a front-face side when an ink cartridge 30 is equipped.

[0036] In addition, each circuit board 39 which differences other than the data of each circuit board 39 in this operation gestalt stored constitutionally and the substantial difference in the appearance configuration of each circuit board 39 do not have, and is specifically attached in each ink cartridge 30 is the same object substantially on the gestalt.

[0037] top-face opening of the body 33 of a container and the body 33 of a container of the abbreviation rectangular parallelepiped configuration where the top face which constitutes an ink restoration field carried out opening of the ink cartridge case 31 -- oscillating joining etc. -- liquid -- it consists of covering device material 34 joined densely. The heights 38 which equipped the ink jet type recording device 11 with the ink feed hopper 37 which supplies ink lean toward the front 31a side, and are prepared in the base of the body 33 of a container. While a valve system 40 is formed in the interior of the ink feed hopper 37, the seal rubber which is not illustrated is inserted in, and when the ink cartridge holder 22 is equipped with an ink cartridge 30 by this, it is constituted so that a liquid spill etc. may be prevented.

[0038] A porous body 32 consists of a spring material which has much open-cell pores, and insertion restoration is carried out into the body 33 of a container. And absorption maintenance of the ink with which it filled up in the body 33 of a container is carried out by capillarity at this porous body 32. The ink with which an ink cartridge 30 is filled up is ink which made the solvent dissolve or distribute a color or a pigment, and it fills up with the ink of four colors of black (B), cyanogen (C), MAZENDA (M), and yellow (Y) every ink cartridge 30 in this operation gestalt.

[0039] Here, in the class, i.e., this operation gestalt, of the ink with which an ink cartridge 30 is filled up, as shown in drawing 5 , the circuit board 39 with which front 31a of an ink cartridge 30 is equipped is attached so that it may become a location which is different in every black (B), cyanogen (C), MAZENDA (M), and Yellow (Y). Namely, in the condition of having made the ink cartridge 30 arranging in parallel, for every class of ink with which it filled up, each circuit board 39 is attached so that it may have the difference of elevation to a perpendicular direction. Arrangement of this circuit board 39 can arrange the circuit board 39 in a different location for every class of ink by choosing the

pin 36 of a different location for every class of ink.
[0040] In addition, constitutionally, there is no substantial difference in the difference about except the attaching position of this circuit board 39 and the appearance-specifically configuration between each ink cartridge 30 in each ink cartridge 30 in this operation gestalt, and each ink cartridge 30 is the same object substantially on that gestalt.
[0041] As shown in <ink cartridge holder 22> drawing 6 , the ink cartridge holder 22 consists of synthetic resin of the letter of the abbreviation for L characters which has pars-basilaris-ossis-occipitalis 22a and wall 22b. With wall 22b, rib 22c of the letter of the cross-section abbreviation for L characters which extended perpendicularly is prepared in two corners of the end of pars-basilaris-ossis-occipitalis 22a of the opposite side. And it is equipped with two or more ink cartridges 30 between this wall 22b and rib 22c.
[0042] The recording head 26 as a printing mechanism which consists of the print head sections 25 of the ink jet type which makes an ink droplet the ink supply needle 24 and ink to which ink is led, and carries out the regurgitation etc. is attached in the base of pars-basilaris-ossis-occipitalis 22a of the ink cartridge holder 22 through the pedestal 27 from the ink cartridge 30 with which it is equipped. Two or more ink supply needles 24 are formed corresponding to the ink cartridge 30 with which it is installed and equipped so that it may extend perpendicularly through a pedestal 27. And in this recording head 26, the ink supply path which consists of an ink supply needle 24, an ink flow way (not shown) which flows through the ink supply needle 24 and the print head section 25 is formed according to the individual for every class of ink.
[0043] Two or more installation of the attachment 29 as an electrical connection terminal which constitutes said a part of distinction means in wall 22b of the ink cartridge holder 22 is carried out in the location corresponding to the ink supply needle 24 mentioned above. Attachment 29 is connected with the IC substrate 28 which performs printing control of discharging control of the ink of a recording head 26 etc. to a rear-face side while it is equipped with contact formation section 29a which forms at least two or more contact surfaces constituted so that it might project in the front-face side of wall 22b. In addition, the IC substrate 28 is connected with the control section 19 which is not illustrated as a distinction means of the ink jet type recording device 11 through the flexible flat cable 20 as shown in drawing 1 .
[0044] Here, attachment 29 is arranged so that it may become a location which is different in every black (B), cyanogen (C), MAZENDA (M), and Yellow (Y) in the class, i.e., this operation gestalt, of ink of an ink cartridge 30 corresponding to the circuit board 39 of an ink cartridge 30 mentioned above. That is, like illustration, it is equipped so that predetermined spacing may be set to a perpendicular direction and it may have the difference of elevation corresponding to the class of ink with which the ink cartridge 30 with which it is equipped was filled up.
[0045] <Operation> drawing 7 shows the condition that the ink cartridge holder 22 was equipped with the ink cartridge 30. In this condition, the ink supply needle 24 of the recording head 26 of the ink cartridge holder 22 is inserted in the ink feed hopper 37 of the ink cartridge case 31, and the valve system 40 of an ink cartridge 30 is wide opened with this ink supply needle 24. Thereby, the ink by which absorption maintenance was carried out follows the ink supply path 37, i.e., the ink feed hopper, the ink supply needle

24, an ink flow way that is not illustrated of each color proper, and comes to be supplied to the print head section 25 at the porous body 32 of each ink cartridge 30.
[0046] In this wearing condition, engagement contact of the contact formation section 29a of the attachment 29 by which the circuit board 39 of an ink cartridge 30 was installed through that contact 39a by wall 22b of the ink cartridge holder 22 is carried out. For this reason, as for the circuit board 39, electrical installation will be formed between the ink jet type recording devices 11 through attachment 29, the IC substrate 28, and the flexible flat cable 20.
[0047] Here, as mentioned above, attachment arrangement of the circuit board 39 and attachment 29 of an ink cartridge 30 is carried out so that it may become a different location for every class of ink. It means that the stowed position of the ink cartridge [in / in this / the ink cartridge holder 22] 30 is determined as the proper for every ink class, respectively.
[0048] Therefore, as the ink cartridge 30 with which the predetermined stowed position beforehand defined according to the class of ink was equipped was mentioned above, contact 39a of the circuit board 39 contacts contact formation section 29a of attachment 29, and electrical installation is formed. On the other hand, since the attaching position of contact formation section 29a of attachment 29 and contact 39a of the circuit board 39 does not correspond when equipped in addition to the predetermined stowed position where the ink cartridge 30 was beforehand defined according to the class of ink (i.e., when incorrect wearing of an ink cartridge 30 is made), electrical installation is not formed.
[0049] Thus, the transfer of data with the control section 19 by the side of ink jet type recording apparatus 11 body of the circuit board 39 of the ink cartridge 30 in which electrical installation with the ink jet type recording apparatus 11 was formed is attained, and distinction of the class of ink of an ink cartridge 30, the ink residue management of it for every class of ink, etc. are attained by the control section 19.
[0050] And by performing motion control of the carriage mentioned above and a carriage device, and printing control of a recording head 26, the ink droplet of each color will be breathed out by the print sheet 12 from a recording head 26, and color printing will be realized by the control section 19 by the side of ink jet type recording apparatus 11 body.
[0051] Therefore, according to this operation gestalt, the following effectiveness is done so.
[0052] - The circuit board 39 has been arranged in a location which is different so that it may have the difference of elevation for every class of ink to an ink cartridge 30, using the circuit board 39 as a discernment means. Thereby, the class of ink with which the ink cartridge 30 is filled up can be electrically discriminated now from the attaching position of the circuit board 39. And without complicating the mechanical configuration of ink cartridge case 31 grade, the class of ink with which the ink cartridge 30 was filled up, using efficiently the existing component part used for other purposes can be identified now, and incorrect wearing of an ink cartridge 30 can be prevented with a simple configuration.
[0053] - It was not concerned with the class of ink filled up with each ink cartridge 30, but the same object was used substantially. Since this does not need the ink cartridge 30 of a different configuration for every class of ink, communalization of a component part is attained and it can contribute to cheap-ization.

[0054] - It was not concerned with the class of the ink cartridge 30 equipped with the circuit board 39 attached in each ink cartridge 30, and ink, but the same object was used substantially. Since this does not need the circuit board 39 different every class of ink, and every ink cartridge 30 attached, communalization of a component part can be attained, and although it contributes to cheap-ization, it can do.
[0055] - Two or more pins 36 were installed in two or more upper and lower sides side by side at front 31a of an ink cartridge 30, and installation of the circuit board 39 was enabled by carrying out the heat caulking of the pin 36 alternatively. As mentioned above, while being able to use now the ink cartridge case 31 of the same configuration by this, it becomes possible not to be concerned with the attaching position but to attach the circuit board 39 by the same approach. Therefore, the means of attachment of the circuit board 39 can be communalized, communalization of the production line in a production process is attained, and it can contribute to cheap-ization.
[0056] - In the control section 19 by the side of ink jet type recording apparatus 11 body, the electrical installation relation between the circuit board 39 of an ink cartridge 30 and contact formation section 29a of attachment 29 is detected, and it identified whether it was incorrect wearing of an ink cartridge 30. That is, unlike discernment of incorrect wearing of the ink cartridge 30 by visual inspection by the conventional human being, both engagement relation is detected electrically and the class of ink with which the ink cartridge 30 was filled up was distinguished.
[0057] Thereby, in the control section 19 by the side of ink jet type recording apparatus 11 body, an ink cartridge 30 can identify whether it is equipped suitable for the predetermined stowed position beforehand defined for every class of ink, and can identify incorrect wearing of an ink cartridge 30 simply and certainly. This means that the class of ink with which the ink cartridge 30 was filled up becomes identifiable from the attaching position of the circuit board 39 attached in the ink cartridge 30, if it puts in another way. And for example, it can be made to identify certainly by making the output display of incorrect wearing of an ink cartridge 30 etc. perform from a control section 19 whether it is incorrect wearing.
[0058] Moreover, since incorrect wearing of each ink cartridge 30 can be identified now in the wearing condition of an ink cartridge 30, printing control is restricted in the case of incorrect wearing of an ink cartridge 30, and it becomes possible to prevent unsuitable printing beforehand.
[0059] Furthermore, it becomes [whether it was equipped with the ink cartridge 30, and / whether it was equipped with the suitable ink cartridge 30, and] possible by making the existence of not only discernment of incorrect wearing of an ink cartridge 30 but wearing of an ink cartridge 30 identify to identify to coincidence.
[0060] In addition, this invention is the range which is not limited to the configuration of said both operation gestalt, and does not deviate from the meaning of this invention, and the configuration of each part is changed into arbitration and it can also take shape.
[0061] - Prepare separately, without carrying the ink cartridge holder 22 in carriage 21. It is because the same effectiveness is demonstrated even if it is the mode of the so-called both sides of on-carriage / off carriage.
[0062] - While using magnetic generating means, such as a magnet, as a discernment means, identify the class of ink with which the ink cartridge 30 was filled up by the strength of the magnetism detected, using magnetic detection means, such as a

magnetometric sensor, as a distinction means. Even if such, it is because the attaching position of the discernment means arranged in a different location for every class of ink is detectable based on the relative attaching position relation between a discernment means and a distinction means.
[0063] Next, the technical thought which can be grasped from the above-mentioned operation gestalt is indicated below.
[0064] - Ink jet type recording apparatus characterized by having a distinction means to distinguish the class of ink of an ink cartridge with which it was equipped from the attaching position of the discernment means which the ink cartridge with which the ink of each color was filled up is the ink jet type recording apparatus two or more wearing of the desorption of is enabled, and was formed in the ink cartridge in an ink cartridge wearing condition.
[0065] an ink cartridge -- wearing -- a condition -- setting -- discernment -- a means -- an attaching position -- detecting -- ink -- a class -- distinguishing -- making -- a sake -- the former -- visual inspection -- an activity -- depending -- incorrect -- wearing -- discernment -- an approach -- comparing -- being simple -- a configuration -- easy -- and -- certain -- the class of ink -- discriminable -- coming . Thereby, incorrect wearing of an ink cartridge can be identified and incorrect wearing of an ink cartridge based on the class of ink can be certainly prevented now.
[0066] Moreover, since the class of ink was identified in the wearing condition of an ink cartridge, unsuitable printing after incorrect wearing of an ink cartridge can be prevented beforehand. And it can become [whether it was equipped with the ink cartridge, and / whether it was equipped with the suitable ink cartridge, and] possible to identify to coincidence, and the efficiency of the configuration of the whole equipment can be made to increase by making the existence of wearing of an ink cartridge identify.
[0067]
[Effect of the Invention] As explained in full detail above, according to this invention, the simple ink cartridge of a configuration of discernment of incorrect wearing of an ink cartridge having been easily possible, and having attained communalization of a component part, and having promoted cheap-ization can be offered by having established the discernment means with which the class of ink was electrically identified by the ink cartridge according to the attaching position.
[0068] Moreover, easy and the simple ink jet type recording apparatus of a configuration which can identify incorrect wearing of an ink cartridge certainly can be offered by establishing a distinction means to distinguish the class of ink of an ink cartridge with which it was equipped from the attaching position of the discernment means formed in the ink jet type recording apparatus at the ink cartridge.

TECHNICAL FIELD

[Field of the Invention] This invention is concerned with an ink cartridge and an ink jet type recording device.

PRIOR ART

[Description of the Prior Art] Conventionally, in the ink jet type recording apparatus which records using the ink of two or more colors, what equipped with two or more ink cartridges with which the ink of each color was filled up according to the individual, respectively possible [desorption] is known. In this ink jet type recording apparatus, since it becomes exchangeable [a specific ink cartridge] according to the operating frequency of ink, ink can be exhausted without futility for every color, and it has the description of excelling in economical efficiency.

[0003] the ink supply path which consists of ink flow ways between the ink supply needles, ink supply needles, and ink heads which lead ink from an ink cartridge etc. in such an ink jet type recording apparatus -- each color -- it is prepared individually. Moreover, by equipping with an ink cartridge the ink cartridge applied part which the stowed position is beforehand defined for every class of ink, and was able to define each ink cartridge beforehand, the ink of each color is constituted so that an ink head may be supplied via the ink supply path of a proper, respectively.

[0004] And in the control section by the side of the body of an ink jet type recording device etc., by performing printing control of the ink regurgitation in an ink head etc. for every color, it is constituted so that color printing may be realized. Therefore, it is necessary to equip with each ink cartridge suitable for the predetermined stowed position which was able to be defined for every color, respectively in the cases, such as exchange of an ink cartridge.

[0005] As an ink jet type recording apparatus which has the incorrect wearing prevention means of such an ink cartridge, while preparing concave heights in the wall of an ink cartridge applied part in JP,4-185355,A, the ink jet type recording apparatus which prepared concave heights in the outer wall of each ink cartridge so that it might correspond to this is indicated. In this ink jet type recording apparatus, incorrect wearing of an ink cartridge can be prevented now by making the configuration of concave heights different for every ink cartridge based on the class of ink with which it fills up.

EFFECT OF THE INVENTION

[Effect of the Invention] As explained in full detail above, according to this invention, the simple ink cartridge of a configuration of discernment of incorrect wearing of an ink cartridge having been easily possible, and having attained communalization of a component part, and having promoted cheap-ization can be offered by having established the discernment means with which the class of ink was electrically identified by the ink cartridge according to the attaching position.

[0068] Moreover, easy and the simple ink jet type recording apparatus of a configuration which can identify incorrect wearing of an ink cartridge certainly can be offered by establishing a distinction means to distinguish the class of ink of an ink cartridge with which it was equipped from the attaching position of the discernment means formed in the ink jet type recording apparatus at the ink cartridge.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, in an incorrect wearing prevention means which is indicated in above-mentioned JP,4-185355,A, there was a problem of being disadvantageous inconvenience when the ink cartridge case where it has a different configuration for every class of ink is needed, communalization of a component part cannot be attained but a cost cut is aimed at.

[0007] Moreover, by preventing the incorrect insertion to the ink cartridge applied part of an ink cartridge, the above-mentioned incorrect wearing prevention means prevents incorrect wearing, and does not identify incorrect wearing in the wearing condition of an ink cartridge. Therefore, for example, when the configuration of the concave heights in each ink cartridge is a difference of some configurations, it may be equipped compulsorily. And since a check of the incorrect wearing is what is depended on visual inspection, a mistake may produce it in the case of the visual inspection. Furthermore, a visual inspection activity is not made certainly, but when incorrect-equipped, a printing result (printed matter) will be checked and it can be identified by judging whether suitable color printing was realized whether it was incorrect wearing for the first time. In such a case, an ink supply path will be polluted by incorrect wearing of an ink cartridge in the ink of other colors, and there was a problem that the washing took time and effort.

[0008] These problems can respond by forming or securing dimensional accuracy between the configuration of the concave heights of an ink cartridge applied part, and the configuration of the concave heights of an ink cartridge so that it may become a configuration which is different for every class of ink in the configuration of the concave heights of an ink cartridge. However, if it does in this way, like the above as a result, a configuration will become complicated and it will become disadvantageously inconvenient, when communalization of a component part cannot be attained but a cost cut is aimed at.

[0009] This invention is to offer the simple ink cartridge and ink jet type recording device of a configuration of it having been made in view of the above-mentioned problem, and could identify incorrect wearing of an ink cartridge easily [the purpose] and certainly, and having attained communalization of a component part, and having promoted cheap-ization.

MEANS

[Means for Solving the Problem] In order to solve the above-mentioned trouble, invention according to claim 1 is an ink cartridge two or more wearing of the desorption of is enabled to an ink jet type recording apparatus, and is characterized by having the discernment means with which the class of ink was electrically identified according to the attaching position.

[0011] Thus, as compared with the incorrect wearing discernment approach by the conventional visual inspection activity, the class of ink can be identified now easily and certainly with a simple configuration by establishing the discernment means with which the class of ink was electrically identified by the ink cartridge according to the attaching

position.
[0012] In an ink cartridge according to claim 1, invention according to claim 2 is characterized by the configuration of each attachment means being the same while an attachment means to attach said discernment means is formed in two or more locations.
[0013] Thus, if constituted, the attachment means of a specific location is chosen as arbitration from the attachment means formed in two or more locations of an ink cartridge, since it cannot be concerned with the attaching position but a discernment means can be attached in each ink cartridge by the same approach, the communalization like the shipfitter of the discernment means in a production line can be attained, and, thereby, cheap-ization can be promoted.
[0014] Invention according to claim 3 is characterized by the configuration of the discernment means of each of said ink cartridge being the same configuration in an ink cartridge according to claim 1 or 2.
[0015] If the configuration of the discernment means of each ink cartridge is made into the same configuration, a different discernment means for every class of ink and every ink cartridge is not needed, but communalization of the discernment means as a component part can be attained. Thereby, communalization of a production line can be attained and cheap-ization can be promoted now.
[0016] Invention according to claim 4 is characterized by the case configuration of each of said ink cartridge being the same configuration in an ink cartridge given in either of claim 1 to claims 3.
[0017] If the case configuration of each ink cartridge is made into the same configuration, the ink cartridge which has a different configuration for every class of ink is not needed, but communalization of the case of the ink cartridge as a component part can be attained. Thereby, communalization of a production line can be attained and cheap-ization can be promoted now.
[0018] Invention according to claim 5 is characterized by said discernment means being the circuit board which has a storage element in an ink cartridge given in either of claim 1 to claims 4.
[0019] Thus, if constituted, a configuration can be made simpler by using the existing component parts, such as the circuit board which is used for other purposes, for example, has the storage element which made the information about an ink residue memorize.
[0020] Invention according to claim 6 is characterized by having a discernment means to discriminate the class of ink from the distinction means formed in the recording apparatus concerned electrically in a connectable location, only when it is the ink cartridge two or more wearing of the desorption of is enabled and an ink jet type recording apparatus is equipped in the suitable stowed position in said recording apparatus.
[0021] Thus, in order for a distinction means and a discernment means to connect electrically only when the suitable stowed position in a recording device is equipped with an ink cartridge if constituted, the class of ink can be identified easily and certainly by distinguishing this electrical installation condition. Thereby, as compared with the incorrect wearing discernment approach by the conventional visual inspection activity, the class of ink can be identified now easily and certainly with a simple configuration.
[0022] The ink cartridge with which the ink of each color was filled up is the ink jet type recording apparatus two or more wearing of the desorption of is enabled, and invention according to claim 7 is characterized by having a distinction means to distinguish the

class of ink of an ink cartridge with which it was equipped from the attaching position of the discernment means formed in the ink cartridge.
[0023] Since the class of ink of an ink cartridge with which the body side of an ink jet type recording apparatus was equipped from the attaching position of the discernment means of an ink cartridge was distinguished, as compared with the incorrect wearing discernment approach by the conventional visual inspection activity, the class of ink can be identified easily and certainly with a simple configuration. And since the class of ink is discriminable in the wearing condition of an ink cartridge, unsuitable printing after incorrect wearing of an ink cartridge can be prevented beforehand.
[0024] In an ink jet type recording apparatus according to claim 7, said distinction means is beforehand formed in the location which changes with classes of ink of an ink cartridge with which it is equipped, and invention according to claim 8 is characterized by distinguishing the class of ink according to engagement relation with said discernment means.
[0025] In a distinction means, by distinguishing the class of ink according to engagement relation with a discernment means, the class of ink of an ink cartridge can be identified now and discernment of the class of ink can be ensured [easily and] now by the body side of an ink jet type recording apparatus as compared with the incorrect wearing discernment approach by the conventional visual inspection activity.
[0026] While said discernment means is the circuit board in which invention according to claim 9 has a storage element in an ink jet type recording device according to claim 8, said distinction means is characterized by distinguishing the class of ink from an electrical installation condition with the circuit board concerned.
[0027] By distinguishing the class of ink from an electrical installation condition with a discernment means, it becomes possible to identify the class of ink more easily and certainly as compared with the incorrect wearing discernment approach by the conventional visual inspection activity. And a configuration can be made simpler by using the existing component parts, such as the circuit board which is used for other purposes, for example, has the storage element which made the information about an ink residue memorize.
[0028]
[Embodiment of the Invention] Hereafter, the first operation gestalt which materialized this invention is explained according to drawing 1 - drawing 7 .
[0029] As shown in <whole configuration> drawing 1 , the ink jet type recording apparatus 11 is equipped with the carriage which conveys a print sheet 12, and the carriage device in which it has carriage 21. The ink cartridge holder 22 with which carriage 21 is equipped with two or more ink cartridges 30 possible [desorption] is carried.
[0030] It consists of the paper feed roller 14, other rollers which are not illustrated which make the paper feed motor 13 and a platen roller serve a double purpose, and the paper feed roller 14 and other rollers which are not illustrated rotate by the drive of the paper feed motor 13, and carriage is constituted so that conveyance of a print sheet 12 may be performed.
[0031] A carriage device consists of timing belts 18 stretched between the shaft of said paper feed roller 14, and the guide member 15 constructed over parallel, the carriage motor 16 and the pulley 17 of a pair. And carriage 21 is constituted so that both-way

sliding may be carried out by the drive of the carriage motor 16 in the paper width direction of a print sheet 12 on the guide member 15 through a timing belt 18.
[0032] As shown in drawing 2 , the controlling mechanism of this ink jet type recording device 11 is constituted considering RAM19b which stores temporarily ROM19a which stores the control section 19 as a distinction means which consists of a well-known CPU etc., various programs, etc., working data, etc. as a core. This controlling mechanism performs various kinds of control, such as motion control in the carriage and the carriage device which were mentioned above, and printing control in the printing mechanism mentioned later.
[0033] In a <ink cartridge> book operation gestalt, each ink cartridge 30 with which the ink cartridge holder 22 is equipped is not concerned with the class of ink with which it fills up, but takes the same configuration as abbreviation. Hereafter, the configuration of an ink cartridge 30 is explained in full detail.
[0034] As shown in drawing 3 and drawing 4 , an ink cartridge 30 consists of porous bodies 32 by which the appearance configuration is contained in the ink cartridge case 31 made of synthetic resin where it has an abbreviation rectangular parallelepiped configuration as a whole, and its ink cartridge case 31. The lower part of front 31a of the ink cartridge case 31 is formed in a concave, and the pin 36 as an attachment means is installed in the crevice by two or more upper and lower sides side by side. And based on the class of ink with which it fills up, the pin 36 of arbitration is chosen as an object for immobilization of the circuit board 39, and it is equipped with the circuit board 39 as a discernment means by carrying out the heat caulking of the selected pin 36 so that it may mention later.
[0035] The circuit board 39 has the nonvolatile memory (EEPROM) which is not illustrated as a storage element holding the contents even if it can rewrite the contents of storage and supply of a power source is lost. Data, such as the ink color held in the ink cartridge 30, i.e., the class of ink and the amount of ink, the date of manufacture, and a part number, are stored in nonvolatile memory, and it is used for ink residue management of an ink cartridge 30 etc. And said nonvolatile memory connected with such contact 39a is mounted in a rear-face side, the mold of the whole is carried out by the charge of ink-proof lumber, and this circuit board 39 is made into the non-exposure while it has two or more contact 39a in a front-face side when an ink cartridge 30 is equipped.
[0036] In addition, each circuit board 39 which differences other than the data of each circuit board 39 in this operation gestalt stored constitutionally and the substantial difference in the appearance configuration of each circuit board 39 do not have, and is specifically attached in each ink cartridge 30 is the same object substantially on the gestalt.
[0037] top-face opening of the body 33 of a container and the body 33 of a container of the abbreviation rectangular parallelepiped configuration where the top face which constitutes an ink restoration field carried out opening of the ink cartridge case 31 -- oscillating joining etc. -- liquid -- it consists of covering device material 34 joined densely. The heights 38 which equipped the ink jet type recording device 11 with the ink feed hopper 37 which supplies ink lean toward the front 31a side, and are prepared in the base of the body 33 of a container. While a valve system 40 is formed in the interior of the ink feed hopper 37, the seal rubber which is not illustrated is inserted in, and when the ink cartridge holder 22 is equipped with an ink cartridge 30 by this, it is constituted so

that a liquid spill etc. may be prevented.
[0038] A porous body 32 consists of a spring material which has much open-cell pores, and insertion restoration is carried out into the body 33 of a container. And absorption maintenance of the ink with which it filled up in the body 33 of a container is carried out by capillarity at this porous body 32. The ink with which an ink cartridge 30 is filled up is ink which made the solvent dissolve or distribute a color or a pigment, and it fills up with the ink of four colors of black (B), cyanogen (C), MAZENDA (M), and yellow (Y) every ink cartridge 30 in this operation gestalt.
[0039] Here, in the class, i.e., this operation gestalt, of the ink with which an ink cartridge 30 is filled up, as shown in drawing 5 , the circuit board 39 with which front 31a of an ink cartridge 30 is equipped is attached so that it may become a location which is different in every black (B), cyanogen (C), MAZENDA (M), and Yellow (Y). Namely, in the condition of having made the ink cartridge 30 arranging in parallel, for every class of ink with which it filled up, each circuit board 39 is attached so that it may have the difference of elevation to a perpendicular direction. Arrangement of this circuit board 39 can arrange the circuit board 39 in a different location for every class of ink by choosing the pin 36 of a different location for every class of ink.
[0040] In addition, constitutionally, there is no substantial difference in the difference about except the attaching position of this circuit board 39 and the appearance-specifically configuration between each ink cartridge 30 in each ink cartridge 30 in this operation gestalt, and each ink cartridge 30 is the same object substantially on that gestalt.
[0041] As shown in <ink cartridge holder 22> drawing 6 , the ink cartridge holder 22 consists of synthetic resin of the letter of the abbreviation for L characters which has pars-basilaris-ossis-occipitalis 22a and wall 22b. With wall 22b, rib 22c of the letter of the cross-section abbreviation for L characters which extended perpendicularly is prepared in two corners of the end of pars-basilaris-ossis-occipitalis 22a of the opposite side. And it is equipped with two or more ink cartridges 30 between this wall 22b and rib 22c.
[0042] The recording head 26 as a printing mechanism which consists of the print head sections 25 of the ink jet type which makes an ink droplet the ink supply needle 24 and ink to which ink is led, and carries out the regurgitation etc. is attached in the base of pars-basilaris-ossis-occipitalis 22a of the ink cartridge holder 22 through the pedestal 27 from the ink cartridge 30 with which it is equipped. Two or more ink supply needles 24 are formed corresponding to the ink cartridge 30 with which it is installed and equipped so that it may extend perpendicularly through a pedestal 27. And in this recording head 26, the ink supply path which consists of an ink supply needle 24, an ink flow way (not shown) which flows through the ink supply needle 24 and the print head section 25 is formed according to the individual for every class of ink.
[0043] Two or more installation of the attachment 29 as an electrical connection terminal which constitutes said a part of distinction means in wall 22b of the ink cartridge holder 22 is carried out in the location corresponding to the ink supply needle 24 mentioned above. Attachment 29 is connected with the IC substrate 28 which performs printing control of discharging control of the ink of a recording head 26 etc. to a rear-face side while it is equipped with contact formation section 29a which forms at least two or more contact surfaces constituted so that it might project in the front-face side of wall 22b. In

addition, the IC substrate 28 is connected with the control section 19 which is not illustrated as a distinction means of the ink jet type recording device 11 through the flexible flat cable 20 as shown in drawing 1 .

[0044] Here, attachment 29 is arranged so that it may become a location which is different in every black (B), cyanogen (C), MAZENDA (M), and Yellow (Y) in the class, i.e., this operation gestalt, of ink of an ink cartridge 30 corresponding to the circuit board 39 of an ink cartridge 30 mentioned above. That is, like illustration, it is equipped so that predetermined spacing may be set to a perpendicular direction and it may have the difference of elevation corresponding to the class of ink with which the ink cartridge 30 with which it is equipped was filled up.

[0045] <Operation> drawing 7 shows the condition that the ink cartridge holder 22 was equipped with the ink cartridge 30. In this condition, the ink supply needle 24 of the recording head 26 of the ink cartridge holder 22 is inserted in the ink feed hopper 37 of the ink cartridge case 31, and the valve system 40 of an ink cartridge 30 is wide opened with this ink supply needle 24. Thereby, the ink by which absorption maintenance was carried out follows the ink supply path 37, i.e., the ink feed hopper, the ink supply needle 24, an ink flow way that is not illustrated of each color proper, and comes to be supplied to the print head section 25 at the porous body 32 of each ink cartridge 30.

[0046] In this wearing condition, engagement contact of the contact formation section 29a of the attachment 29 by which the circuit board 39 of an ink cartridge 30 was installed through that contact 39a by wall 22b of the ink cartridge holder 22 is carried out. For this reason, as for the circuit board 39, electrical installation will be formed between the ink jet type recording devices 11 through attachment 29, the IC substrate 28, and the flexible flat cable 20.

[0047] Here, as mentioned above, attachment arrangement of the circuit board 39 and attachment 29 of an ink cartridge 30 is carried out so that it may become a different location for every class of ink. It means that the stowed position of the ink cartridge [in / in this / the ink cartridge holder 22] 30 is determined as the proper for every ink class, respectively.

[0048] Therefore, as the ink cartridge 30 with which the predetermined stowed position beforehand defined according to the class of ink was equipped was mentioned above, contact 39a of the circuit board 39 contacts contact formation section 29a of attachment 29, and electrical installation is formed. On the other hand, since the attaching position of contact formation section 29a of attachment 29 and contact 39a of the circuit board 39 does not correspond when equipped in addition to the predetermined stowed position where the ink cartridge 30 was beforehand defined according to the class of ink (i.e., when incorrect wearing of an ink cartridge 30 is made), electrical installation is not formed.

[0049] Thus, the transfer of data with the control section 19 by the side of ink jet type recording apparatus 11 body of the circuit board 39 of the ink cartridge 30 in which electrical installation with the ink jet type recording apparatus 11 was formed is attained, and distinction of the class of ink of an ink cartridge 30, the ink residue management of it for every class of ink, etc. are attained by the control section 19.

[0050] And by performing motion control of the carriage mentioned above and a carriage device, and printing control of a recording head 26, the ink droplet of each color will be breathed out by the print sheet 12 from a recording head 26, and color printing will be

realized by the control section 19 by the side of ink jet type recording apparatus 11 body.
[0051] Therefore, according to this operation gestalt, the following effectiveness is done so.
[0052] - The circuit board 39 has been arranged in a location which is different so that it may have the difference of elevation for every class of ink to an ink cartridge 30, using the circuit board 39 as a discernment means. Thereby, the class of ink with which the ink cartridge 30 is filled up can be electrically discriminated now from the attaching position of the circuit board 39. And without complicating the mechanical configuration of ink cartridge case 31 grade, the class of ink with which the ink cartridge 30 was filled up, using efficiently the existing component part used for other purposes can be identified now, and incorrect wearing of an ink cartridge 30 can be prevented with a simple configuration.
[0053] - It was not concerned with the class of ink filled up with each ink cartridge 30, but the same object was used substantially. Since this does not need the ink cartridge 30 of a different configuration for every class of ink, communalization of a component part is attained and it can contribute to cheap-ization.
[0054] - It was not concerned with the class of the ink cartridge 30 equipped with the circuit board 39 attached in each ink cartridge 30, and ink, but the same object was used substantially. Since this does not need the circuit board 39 different every class of ink, and every ink cartridge 30 attached, communalization of a component part can be attained, and although it contributes to cheap-ization, it can do.
[0055] - Two or more pins 36 were installed in two or more upper and lower sides side by side at front 31a of an ink cartridge 30, and installation of the circuit board 39 was enabled by carrying out the heat caulking of the pin 36 alternatively. As mentioned above, while being able to use now the ink cartridge case 31 of the same configuration by this, it becomes possible not to be concerned with the attaching position but to attach the circuit board 39 by the same approach. Therefore, the means of attachment of the circuit board 39 can be communalized, communalization of the production line in a production process is attained, and it can contribute to cheap-ization.
[0056] - In the control section 19 by the side of ink jet type recording apparatus 11 body, the electrical installation relation between the circuit board 39 of an ink cartridge 30 and contact formation section 29a of attachment 29 is detected, and it identified whether it was incorrect wearing of an ink cartridge 30. That is, unlike discernment of incorrect wearing of the ink cartridge 30 by visual inspection by the conventional human being, both engagement relation is detected electrically and the class of ink with which the ink cartridge 30 was filled up was distinguished.
[0057] Thereby, in the control section 19 by the side of ink jet type recording apparatus 11 body, an ink cartridge 30 can identify whether it is equipped suitable for the predetermined stowed position beforehand defined for every class of ink, and can identify incorrect wearing of an ink cartridge 30 simply and certainly. This means that the class of ink with which the ink cartridge 30 was filled up becomes identifiable from the attaching position of the circuit board 39 attached in the ink cartridge 30, if it puts in another way. And for example, it can be made to identify certainly by making the output display of incorrect wearing of an ink cartridge 30 etc. perform from a control section 19 whether it is incorrect wearing.
[0058] Moreover, since incorrect wearing of each ink cartridge 30 can be identified now

in the wearing condition of an ink cartridge 30, printing control is restricted in the case of incorrect wearing of an ink cartridge 30, and it becomes possible to prevent unsuitable printing beforehand.
[0059] Furthermore, it becomes [whether it was equipped with the ink cartridge 30, and / whether it was equipped with the suitable ink cartridge 30, and] possible by making the existence of not only discernment of incorrect wearing of an ink cartridge 30 but wearing of an ink cartridge 30 identify to identify to coincidence.
[0060] In addition, this invention is the range which is not limited to the configuration of said both operation gestalt, and does not deviate from the meaning of this invention, and the configuration of each part is changed into arbitration and it can also take shape.
[0061] - Prepare separately, without carrying the ink cartridge holder 22 in carriage 21. It is because the same effectiveness is demonstrated even if it is the mode of the so-called both sides of on-carriage / off carriage.
[0062] - While using magnetic generating means, such as a magnet, as a discernment means, identify the class of ink with which the ink cartridge 30 was filled up by the strength of the magnetism detected, using magnetic detection means, such as a magnetometric sensor, as a distinction means. Even if such, it is because the attaching position of the discernment means arranged in a different location for every class of ink is detectable based on the relative attaching position relation between a discernment means and a distinction means.
[0063] Next, the technical thought which can be grasped from the above-mentioned operation gestalt is indicated below.
[0064] - Ink jet type recording apparatus characterized by having a distinction means to distinguish the class of ink of an ink cartridge with which it was equipped from the attaching position of the discernment means which the ink cartridge with which the ink of each color was filled up is the ink jet type recording apparatus two or more wearing of the desorption of is enabled, and was formed in the ink cartridge in an ink cartridge wearing condition.
[0065] an ink cartridge -- wearing -- a condition -- setting -- discernment -- a means -- an attaching position -- detecting -- ink -- a class -- distinguishing -- making -- a sake -- the former -- visual inspection -- an activity -- depending -- incorrect -- wearing -- discernment -- an approach -- comparing -- being simple -- a configuration -- easy -- and -- certain -- the class of ink -- discriminable -- coming . Thereby, incorrect wearing of an ink cartridge can be identified and incorrect wearing of an ink cartridge based on the class of ink can be certainly prevented now.
[0066] Moreover, since the class of ink was identified in the wearing condition of an ink cartridge, unsuitable printing after incorrect wearing of an ink cartridge can be prevented beforehand. And it can become [whether it was equipped with the ink cartridge, and / whether it was equipped with the suitable ink cartridge, and] possible to identify to coincidence, and the efficiency of the configuration of the whole equipment can be made to increase by making the existence of wearing of an ink cartridge identify.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The outline block diagram of an ink jet type recording device.
[Drawing 2] The schematic diagram showing the controlling mechanism of an ink jet type recording device.
[Drawing 3] The perspective view of an ink cartridge.
[Drawing 4] The sectional view of an ink cartridge.
[Drawing 5] The perspective view of each ink cartridge showing the attaching position of the circuit board.
[Drawing 6] The perspective view of an ink cartridge holder.
[Drawing 7] The sectional view of an ink cartridge showing the wearing condition in an ink cartridge holder.
[Description of Notations]
11 -- Ink jet type recording device
19 -- Control section as a distinction means
30 -- Ink cartridge
31 -- Ink cartridge case as a case
36 -- Pin as an attachment means
39 -- The circuit board as a discernment means

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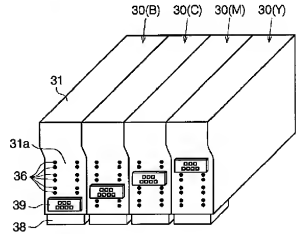
EB59 KC06 KC11 KC30

(54)【発明の名称】　インクカートリッジ及びインクジェット式記録装置

(57)【要約】
【課題】　容易かつ確実にインクカートリッジの誤装着の識別が可能で、かつ、構成部品の共通化を図り低廉化を推進した、構成の簡易なインクカートリッジ及びインクジェット式記録装置を提供すること。
【解決手段】　インクカートリッジ３０の前面３１ａに装着される回路基板３９を、インクカートリッジ３０のインクの種類毎に異なる位置となるように取り付ける。インクカートリッジホルダ２２の壁部２２ｂに貫設された接続機構２９を、インクの種類毎に異なる位置となるように配置する。そして、回路基板３９と接続機構２９との電気的接続関係をインクジェット式記録装置１１本体側の制御部１９において検出することにより、インクカートリッジ３０の誤装着を識別する。



【特許請求の範囲】
【請求項１】　インクジェット式記録装置に脱着可能に複数装着されるインクカートリッジであって、
取付位置に応じてインクの種類が電気的に識別されるようにした識別手段を備えていることを特徴とするインクカートリッジ。
【請求項２】　前記識別手段を取り付ける取付手段が複数の位置に設けられるとともに、各取付手段の構成が同一であることを特徴とする請求項１に記載のインクカートリッジ。
【請求項３】　前記各インクカートリッジの識別手段の形状は、同一形状であることを特徴とする請求項１または請求項２に記載のインクカートリッジ。
【請求項４】　前記各インクカートリッジのケース形状は、同一形状であることを特徴とする請求項１から請求項３のいずれかに記載のインクカートリッジ。
【請求項５】　前記識別手段は、記憶素子を有する回路基板であることを特徴とする請求項１から請求項４のいずれかに記載のインクカートリッジ。
【請求項６】　インクジェット式記録装置に脱着可能に複数装着されるインクカートリッジであって、
前記記録装置における適切な装着位置に装着された場合にのみ、当該記録装置に設けられた判別手段と電気的に接続可能な位置に、インクの種類を電気的に識別する識別手段を備えたことを特徴とするインクカートリッジ。
【請求項７】　各色のインクが充填されたインクカートリッジが脱着可能に複数装着されるインクジェット式記録装置であって、
インクカートリッジに設けられた識別手段の取付位置から、装着されたインクカートリッジのインクの種類を判別する判別手段を備えていることを特徴とするインクジェット式記録装置。
【請求項８】　前記判別手段は、装着されるインクカートリッジのインクの種類により異なる位置に予め設けられ、前記識別手段との係合関係に応じてインクの種類を判別することを特徴とする請求項７に記載のインクジェット式記録装置。
【請求項９】　前記識別手段は、記憶素子を有する回路基板であるとともに、前記判別手段は、当該回路基板との電気的接続状態からインクの種類を判別することを特徴とする請求項８に記載のインクジェット式記録装置。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、インクカートリッジ及びインクジェット式記録装置に関わるものである。
【０００２】
【従来の技術】従来、複数色のインクを使用して記録を行うインクジェット式記録装置において、各色のインクがそれぞれ個別に充填されたインクカートリッジを脱着可能に複数装着するようにしたものが知られている。このインクジェット式記録装置においては、インクの使用頻度に応じて特定のインクカートリッジのみの交換が可能となるため、各色毎にインクを無駄なく使い切ることができ、経済性に優れているという特徴を有する。
【０００３】このようなインクジェット式記録装置においては、インクカートリッジからインクを導くインク供給針や、インク供給針とインクヘッドとの間のインク導通路などから構成されるインク供給経路が各色個別に設けられている。また、インクカートリッジは、インクの種類毎にその装着位置が予め定められており、各インクカートリッジを予め定められたインクカートリッジ装着部に装着することにより、各色のインクはそれぞれ固有のインク供給経路を経由してインクヘッドに供給されるように構成されている。
【０００４】そして、インクジェット式記録装置本体側の制御部などにおいて、インクヘッドにおけるインク吐出などの印字制御が、各色毎に行われることにより、カラー印刷が実現されるように構成されている。そのため、インクカートリッジの交換などの際には、各インクカートリッジを、それぞれ各色毎に定められた所定の装着位置に適切に装着する必要がある。
【０００５】このようなインクカートリッジの誤装着防止手段を有するインクジェット式記録装置として、例えば、特開平４－１８５３５５号公報において、インクカートリッジ装着部の内壁に凹凸部を設けるとともに、これに対応するように各インクカートリッジの外壁に凹凸部を設けたインクジェット式記録装置が開示されている。このインクジェット式記録装置においては、充填されるインクの種類に基づいてインクカートリッジ毎に凹凸部の形状を相違させることにより、インクカートリッジの誤装着を防止することができるようになっている。
【０００６】
【発明が解決しようとする課題】しかし、上記特開平４－１８５３５５号公報にて開示されているような誤装着防止手段においては、インクの種類毎に異なる形状を有するインクカートリッジケースが必要となり、そのため、構成部品の共通化が図れずコストダウンを図る上で不利不便であるという問題があった。
【０００７】また、上記誤装着防止手段は、インクカートリッジのインクカートリッジ装着部への誤挿入を防止することにより誤装着を防止するものであり、インクカートリッジの装着状態において誤装着を識別するものではない。そのため、例えば、各インクカートリッジにおける凹凸部の形状が、多少の形状の相違である場合には、強制的に装着される場合があり得る。しかも、その誤装着の確認作業は目視確認によるものであるため、その目視確認の際においてミスが生じることもあり得る。さらに、目視確認作業が確実になされず誤装着された場合などにおいては、印刷結果（印刷物）を確認し、適切なカラー印刷が実現されたか否かを判断することにより

初めて誤装着であったか否かを識別できることとなる。このような場合は、インクカートリッジの誤装着によりインク供給経路が他色のインクにより汚染されてしまい、その洗浄に手間がかかるという問題があった。

【０００８】これらの問題は、インクカートリッジの凹凸部の形状をインクの種類毎に異なる形状となるように形成したり、インクカートリッジ装着部の凹凸部の形状とインクカートリッジの凹凸部の形状との間で寸法精度を確保したりすることにより対応可能である。ところが、このようにすると、結果的に前記と同様に、構成が複雑となり、構成部品の共通化が図れずコストダウンを図る上で不利不便となる。

【０００９】本発明は、上記問題を鑑みてなされたものであり、その目的は、容易かつ確実にインクカートリッジの誤装着を識別が可能で、かつ、構成部品の共通化を図り低廉化を推進した、構成の簡易なインクカートリッジ及びインクジェット式記録装置を提供することにある。

【００１０】

【課題を解決するための手段】上記問題点を解決するために、請求項１に記載の発明は、インクジェット式記録装置に脱着可能に複数装着されるインクカートリッジであって、取付位置に応じてインクの種類が電気的に識別されるようにした識別手段を備えていることを特徴とする。

【００１１】このように、インクカートリッジに、取付位置に応じてインクの種類が電気的に識別されるようにした識別手段を設けることにより、従来の目視確認作業による誤装着識別方法と比較して、簡易な構成で、容易かつ確実にインクの種類を識別できるようになる。

【００１２】請求項２に記載の発明は、請求項１に記載のインクカートリッジにおいて、前記識別手段を取り付ける取付手段が複数の位置に設けられるとともに、各取付手段の構成が同一であることを特徴とする。

【００１３】このように構成すると、インクカートリッジの複数の位置に設けられた取付手段のなかから特定位置の取付手段を任意に選択し、識別手段をその取付位置に関わらず各インクカートリッジに同一方法で取り付けることができるため、製造ラインにおける識別手段の取付工程の共通化を図ることができ、これにより、低廉化を推進することができるようになる。

【００１４】請求項３に記載の発明は、請求項１または請求項２に記載のインクカートリッジにおいて、前記各インクカートリッジの識別手段の形状は、同一形状であることを特徴とする。

【００１５】各インクカートリッジの識別手段の形状を同一形状とすると、インクの種類毎またはインクカートリッジ毎に異なる識別手段を必要とせず、構成部品としての識別手段の共通化を図ることができる。これにより、製造ラインの共通化を図ることができ、低廉化を推進することができるようになる。

【００１６】請求項４に記載の発明は、請求項１から請求項３のいずれかに記載のインクカートリッジにおいて、前記各インクカートリッジのケース形状は、同一形状であることを特徴とする。

【００１７】各インクカートリッジのケース形状を同一形状とすると、インクの種類毎に異なる形状を有するインクカートリッジを必要とせず、構成部品としてのインクカートリッジのケースの共通化を図ることができる。これにより、製造ラインの共通化を図ることができ、低廉化を推進することができるようになる。

【００１８】請求項５に記載の発明は、請求項１から請求項４のいずれかに記載のインクカートリッジにおいて、前記識別手段は、記憶素子を有する回路基板であることを特徴とする。

【００１９】このように構成すると、他の目的に使用される、たとえば、インク残量に関する情報を記憶させた記憶素子などを有する回路基板などの既存の構成部品を用いることにより、構成をより簡易なものとすることができる。

【００２０】請求項６に記載の発明は、インクジェット式記録装置に脱着可能に複数装着されるインクカートリッジであって、前記記録装置における適切な装着位置に装着された場合にのみ、当該記録装置に設けられた判別手段と電気的に接続可能な位置に、インクの種類を電気的に識別する識別手段を備えたことを特徴とする。

【００２１】このように構成すると、インクカートリッジが記録装置における適切な装着位置に装着された場合のみ、判別手段と識別手段とが電気的に接続するようになるため、この電気的接続状態を判別することにより、容易かつ確実にインクの種類を識別できるようになる。これにより、従来の目視確認作業による誤装着識別方法と比較して、簡易な構成で、容易かつ確実にインクの種類を識別できるようになる。

【００２２】請求項７に記載の発明は、各色のインクが充填されたインクカートリッジが脱着可能に複数装着されるインクジェット式記録装置であって、インクカートリッジに設けられた識別手段の取付位置から、装着されたインクカートリッジのインクの種類を判別する判別手段を備えていることを特徴とする。

【００２３】インクジェット式記録装置本体側において、インクカートリッジの識別手段の取付位置から、装着されたインクカートリッジのインクの種類を判別するようにしたため、従来の目視確認作業による誤装着識別方法と比較して、簡易な構成で、容易かつ確実にインクの種類を識別できるようになる。しかも、インクカートリッジの装着状態においてインクの種類を識別することができるため、インクカートリッジの誤装着後における不適切な印刷を未然に防止することができるようになる。

【００２４】請求項８に記載の発明は、請求項７に記載のインクジェット式記録装置において、前記判別手段は、装着されるインクカートリッジのインクの種類により異なる位置に予め設けられ、前記識別手段との係合関係に応じてインクの種類を判別することを特徴とする。

【００２５】判別手段において、識別手段との係合関係に応じてインクの種類を判別することにより、インクジェット式記録装置本体側で、インクカートリッジのインクの種類を識別することができるようになり、従来の目視確認作業による誤装着識別方法と比較して、容易かつ確実にインクの種類の識別を行うことができるようになる。

【００２６】請求項９に記載の発明は、請求項８に記載のインクジェット式記録装置において、前記識別手段は、記憶素子を有する回路基板であるとともに、前記判別手段は、当該回路基板との電気的接続状態からインクの種類を判別することを特徴とする。

【００２７】識別手段との電気的接続状態からインクの種類を判別することにより、従来の目視確認作業による誤装着識別方法と比較して、より容易かつ確実にインクの種類を識別することが可能となる。しかも、他の目的に使用される、たとえば、インク残量に関する情報を記憶させた記憶素子を有する回路基板などの既存の構成部品を用いることにより、構成をより簡易なものとすることができる。

【００２８】

【発明の実施の形態】以下、本発明を具体化した第一実施形態を図１～図７に従って説明する。

【００２９】＜全体構成＞図１に示すように、インクジェット式記録装置１１は、印刷用紙１２を搬送する紙送り機構と、キャリッジ２１を有するキャリッジ機構とを備えている。キャリッジ２１には、複数のインクカートリッジ３０が脱着可能に装着されるインクカートリッジホルダ２２が搭載されている。

【００３０】紙送り機構は、紙送りモータ１３、プラテンローラを兼用する紙送りローラ１４及び図示しない他のローラなどからなり、紙送りモータ１３の駆動により紙送りローラ１４及び図示しない他のローラが回転し、印刷用紙１２の搬送が行われるように構成されている。

【００３１】キャリッジ機構は、前記紙送りローラ１４の軸と平行に架設されたガイド部材１５、キャリッジモータ１６、一対のプーリ１７間に張設されたタイミングベルト１８などから構成される。そして、キャリッジ２１は、キャリッジモータ１６の駆動によりタイミングベルト１８を介して、ガイド部材１５上で印刷用紙１２の紙幅方向に往復摺動されるように構成されている。

【００３２】図２に示すように、このインクジェット式記録装置１１の制御機構は、周知のＣＰＵ等よりなる判別手段としての制御部１９、各種プログラムなどを格納するＲＯＭ１９ａ、ワーキングデータなどを一時的に格納するＲＡＭ１９ｂなどを中心として構成されている。この制御機構は、前述した紙送り機構やキャリッジ機構における動作制御や、後述する印字機構における印字制御などの各種の制御を行う。

【００３３】＜インクカートリッジ＞本実施形態において、インクカートリッジホルダ２２に装着される各インクカートリッジ３０は、充填されるインクの種類に関わらず略同様の構成を採る。以下、インクカートリッジ３０の構成について詳述する。

【００３４】図３及び図４に示すように、インクカートリッジ３０は、その外形形状が全体として略直方体形状を有する合成樹脂製のインクカートリッジケース３１と、そのインクカートリッジケース３１内に収納される多孔質体３２とから構成される。インクカートリッジケース３１の前面３１ａの下部は、凹状に形成され、その凹部には、取付手段としてのピン３６が複数上下に並設されている。そして、後述するように、充填されるインクの種類に基づいて任意のピン３６が回路基板３９の固定用として選択され、その選択されたピン３６を熱かしめすることにより識別手段としての回路基板３９が装着されている。

【００３５】回路基板３９は、記憶内容を書換可能であり、かつ、電源の供給が失われてもその内容を保持する記憶素子としての図示しない不揮発性メモリ（ＥＥＰＲＯＭ）を有している。不揮発性メモリには、インクカートリッジ３０に収容されているインク色、すなわちインクの種類やインク量、製造年月日、製品番号などのデータが格納され、インクカートリッジ３０のインク残量管理などに利用される。そして、この回路基板３９は、インクカートリッジ３０に装着されたときの表面側に複数の接点３９ａを有するとともに、裏面側にこれらの接点３９ａと接続された前記不揮発性メモリが実装され、全体が耐インク製材料によりモールドされて非露出状態とされている。

【００３６】なお、本実施形態における各回路基板３９の構成上、格納されるデータ以外の差異、具体的には、各回路基板３９の外形形状における実質的な差異はなく、各インクカートリッジ３０に取り付けられる各回路基板３９は、その形態上、実質的に同一物である。

【００３７】インクカートリッジケース３１は、インク充填領域を構成する上面が閉口した略直方体形状の容器本体３３と、その容器本体３３の上面開口に振動溶着等により液密に接合される蓋部材３４とから構成される。容器本体３３の底面には、インクジェット式記録装置１１にインクを供給するインク供給口３７を備えた凸部３８が前面３１ａ側に偏して設けられている。インク供給口３７の内部には弁機構４０が設けられるとともに、図示しないシールゴムがはめ込まれ、これによりインクカートリッジ３０がインクカートリッジホルダ２２に装着された際に液漏れなどが防止されるように構成されてい

る。

【００３８】多孔質体３２は、連泡性の多数のポアを有する弾性材料からなり、容器本体３３内に挿入充填されている。そして、容器本体３３内に充填されたインクは、毛管現象によりこの多孔質体３２に吸収保持される。インクカートリッジ３０に充填されるインクは、染料若しくは顔料を溶媒に溶解または分散させたインクであり、本実施形態においては、ブラック（Ｂ）、シアン（Ｃ）、マゼンダ（Ｍ）、イエロー（Ｙ）の４色のインクがインクカートリッジ３０毎に充填されている。

【００３９】ここで、図５に示すように、インクカートリッジ３０の前面３１ａに装着される回路基板３９は、インクカートリッジ３０に充填されるインクの種類、すなわち、本実施形態においては、ブラック（Ｂ）、シアン（Ｃ）、マゼンダ（Ｍ）、イエロー（Ｙ）毎に異なる位置となるように取り付けられている。すなわち、各回路基板３９は、インクカートリッジ３０を並列させた状態において、充填されたインクの種類毎に、垂直方向に対して高低差を有するように取り付けられている。この回路基板３９の配置は、インクの種類毎に異なる位置のピン３６を選択することにより、インクの種類毎に異なる位置に回路基板３９を配置させることができる。

【００４０】なお、本実施形態における各インクカートリッジ３０の構成上、この回路基板３９の取付位置以外についての差異、具体的には、各インクカートリッジ３０間における外形形状における実質的な差異はなく、各インクカートリッジ３０は、その形態上、実質的に同一物である。

【００４１】＜インクカートリッジホルダ２２＞図６に示すように、インクカートリッジホルダ２２は、底部２２ａ及び壁部２２ｂを有する略Ｌ字状の合成樹脂からなる。壁部２２ｂとは反対側の底部２２ａの一端の２隅には、垂直方向に延出した断面略Ｌ字状のリブ２２ｃが設けられている。そして、この壁部２２ｂとリブ２２ｃ間に、複数のインクカートリッジ３０が装着される。

【００４２】インクカートリッジホルダ２２の底部２２ａの底面には、装着されるインクカートリッジ３０からインクを導くインク供給針２４、インクをインク滴として吐出するインクジェット式の印字ヘッド部２５などから構成される印字機構としての記録ヘッド２６が、基台２７を介して取り付けられている。インク供給針２４は、基台２７を介して垂直方向に延出するように貫設され、装着されるインクカートリッジ３０に対応して複数設けられている。そして、この記録ヘッド２６においては、インク供給針２４や、インク供給針２４と印字ヘッド部２５とを導通するインク導通路（図示しない）などから構成されるインク供給経路が、インクの種類毎に個別に形成されている。

【００４３】インクカートリッジホルダ２２の壁部２２ｂには、前記判別手段の一部を構成する電気接続端子としての接続機構２９が、前述したインク供給針２４に対応した位置に、複数貫設されている。接続機構２９は、壁部２２ｂの表面側において、突出するように構成された複数の接点部位を形成する接点形成部２９ａを備えるとともに、裏面側において、記録ヘッド２６のインクの吐出動作制御などの印字制御を行うＩＣ基板２８と接続されている。なお、ＩＣ基板２８は、図１に示すように、フレキシブルフラットケーブル２０を介してインクジェット式記録装置１１の判別手段としての図示しない制御部１９と接続されている。

【００４４】ここで、接続機構２９は、前述したインクカートリッジ３０の回路基板３９に対応して、インクカートリッジ３０のインクの種類、すなわち、本実施形態においては、ブラック（Ｂ）、シアン（Ｃ）、マゼンダ（Ｍ）、イエロー（Ｙ）毎に異なる位置となるように配置されている。すなわち、図示の如く、装着されるインクカートリッジ３０に充填されたインクの種類に対応して、垂直方向に対して所定の間隔をおいて高低差を有するように装着されている。

【００４５】＜作用＞図７は、インクカートリッジ３０が、インクカートリッジホルダ２２に装着された状態を示すものである。この状態では、インクカートリッジケース３１のインク供給口３７に、インクカートリッジホルダ２２の配設ヘッド２６のインク供給針２４が挿通され、このインク供給針２４によりインクカートリッジ３０の弁機構４０が開放されている。これにより、各インクカートリッジ３０の多孔質体３２に吸収保持されたインクが、各色固有のインク供給経路、すなわち、インク供給口３７、インク供給針２４及び図示しないインク導通路などを辿って印字ヘッド部２５へ供給されるようになる。

【００４６】この装着状態においては、インクカートリッジ３０の回路基板３９は、その接点３９ａに、インクカートリッジホルダ２２の壁部２２ｂに貫設された接続機構２９の接点形成部２９ａが係合接触される。このため、回路基板３９は、接続機構２９、ＩＣ基板２８及びフレキシブルフラットケーブル２０を介して、インクジェット式記録装置１１との間で電気的接続が形成されることとなる。

【００４７】ここで、インクカートリッジ３０の回路基板３９及び接続機構２９は、前述したように、インクの種類毎に異なる位置となるように取付配置されている。このことは、インクカートリッジホルダ２２におけるインクカートリッジ３０の装着位置が、インク種類毎にそれぞれ固有に決定されていることを意味する。

【００４８】従って、インクの種類により予め定められた所定の装着位置に装着されたインクカートリッジ３０は、上述したように、回路基板３９の接点３９ａが、接続機構２９の接点形成部２９ａと接触して電気的接続が形成される。これに対し、インクカートリッジ３０がイ

ンクの種類により予め定められた所定の装着位置以外に装着された場合、すなわち、インクカートリッジ３０の誤装着がなされた場合は、接続機構２９の接点形成部２９ａと回路基板３９の接点３９ａとの取付位置が対応しないため、電気的接続が形成されることはない。

【００４９】このようにしてインクジェット式記録装置１１との電気的接続が形成されたインクカートリッジ３０の回路基板３９は、インクジェット式記録装置１１本体側の制御部１９とのデータの授受が可能となり、制御部１９によりインクカートリッジ３０のインクの種類の判別や、インクの種類毎のインク残量管理などが可能となる。

【００５０】そして、インクジェット式記録装置１１本体側の制御部１９により、前述した紙送り機構及びキャリッジ機構の動作制御と、記録ヘッド２６の印字制御とが行われることにより、記録ヘッド２６から各色のインク滴が印刷用紙１２に吐出され、カラー印刷が実現されることとなる。

【００５１】従って、本実施形態によれば、以下のような効果を奏する。

【００５２】・　識別手段として回路基板３９を用い、インクカートリッジ３０に対しインクの種類毎に高低差を有するように異なる位置に回路基板３９を配置した。これにより、回路基板３９の取付位置から、インクカートリッジ３０に充填されているインクの種類を電気的に識別することができるようになる。しかも、インクカートリッジケース３１等の機械的構成を複雑にすることなく、他の目的に使用される既存の構成部品を効率よく用いてインクカートリッジ３０に充填されたインクの種類を識別することができるようになり、簡易な構成でインクカートリッジ３０の誤装着を防止することができる。

【００５３】・　各インクカートリッジ３０を、充填されるインクの種類に関わらず実質的に同一物を用いた。これにより、インクの種類毎に異なる形状のインクカートリッジ３０を必要としないため、構成部品の共通化が図られ、低廉化に寄与することができる。

【００５４】・　各インクカートリッジ３０に取り付けられる回路基板３９を、装着されるインクカートリッジ３０及びインクの種類に関わらず実質的に同一物を用いた。これにより、インクの種類毎または取り付けられるインクカートリッジ３０毎に異なる回路基板３９を必要としないため、構成部品の共通化を図ることができ、低廉化に寄与するができる。

【００５５】・　インクカートリッジ３０の前面３１ａに複数のピン３６を複数上下に並設し、ピン３６を選択的に熱かしめすることにより回路基板３９を取り付け可能とした。これにより、上述したように同一形状のインクカートリッジケース３１を用いることができるようになるとともに、回路基板３９をその取付位置に関わらず同一方法により取り付けることが可能となる。従って、回路基板３９の取付方法を共通化することができることとなり、製造工程における製造ラインの共通化が図られ、低廉化に寄与することができる。

【００５６】・　インクジェット式記録装置１１本体側の制御部１９において、インクカートリッジ３０の回路基板３９と接続機構２９の接点形成部２９ａとの電気的接続関係を検出して、インクカートリッジ３０の誤装着であるか否かを識別するようにした。すなわち、従来の人間による目視確認によるインクカートリッジ３０の誤装着の識別とは異なり、両者の係合関係を電気的に検出して、インクカートリッジ３０に充填されたインクの種類を判別するようにした。

【００５７】これにより、インクジェット式記録装置１１本体側の制御部１９において、インクカートリッジ３０が、インクの種類毎に予め定められた所定の装着位置に適切に装着されているか否かを識別することができ、インクカートリッジ３０の誤装着を簡易にかつ確実に識別することができる。このことは、換言すれば、インクカートリッジ３０に取り付けられた回路基板３９の取付位置から、インクカートリッジ３０に充填されたインクの種類が識別可能となることを意味する。そして、たとえば、制御部１９からインクカートリッジ３０の誤装着の出力表示などを行わせることにより、誤装着であるか否かを確実に識別させることができる。

【００５８】また、インクカートリッジ３０の装着状態において各インクカートリッジ３０の誤装着を識別することができるようになるため、たとえば、インクカートリッジ３０の誤装着の際には印刷制御を制限するなどして、不適切な印刷を未然に防止することが可能となる。

【００５９】さらに、インクカートリッジ３０の誤装着の識別のみならず、インクカートリッジ３０の装着の有無を識別させることにより、インクカートリッジ３０が装着されたか否かと、適切なインクカートリッジ３０が装着されたか否かを同時に識別することが可能となる。

【００６０】尚、本発明は、前記両実施形態の構成に限定されるものではなく、この発明の趣旨から逸脱しない範囲で、各部の構成を任意に変更して具体化することも可能である。

【００６１】・　インクカートリッジホルダ２２をキャリッジ２１に搭載せずに、別個に設けること。所謂、オンキャリッジ／オフキャリッジの双方の態様であっても同様の効果が発揮されるからである。

【００６２】・　識別手段として磁石などの磁気発生手段を用いるとともに、判別手段として磁気センサなどの磁気検出手段を用い、検出される磁力の強弱により、インクカートリッジ３０に充填されたインクの種類の識別を行うこと。このようにしても、インクの種類毎に異なる位置に配置された識別手段の取付位置を、識別手段と判別手段の相対的な取付位置関係に基づいて検出可能だからである。

【００６３】次に上記実施形態から把握できる技術的思想について以下に記載する。

【００６４】・　各色のインクが充填されたインクカートリッジが脱着可能に複数装着されるインクジェット式記録装置であって、インクカートリッジ装着状態におけるインクカートリッジに設けられた識別手段の取付位置から、装着されたインクカートリッジのインクの種類を判別する判別手段を備えていることを特徴とするインクジェット式記録装置。

【００６５】インクカートリッジの装着状態において識別手段の取付位置を検出してインクの種類を判別するようにしため、従来の目視確認作業による誤装着識別方法と比較して、簡易な構成で、容易かつ確実にインクの種類を識別できるようになる。これにより、インクカートリッジの誤装着を識別して、インクの種類に基づくインクカートリッジの誤装着を確実に防止することができるようになる。

【００６６】また、インクカートリッジの装着状態においてインクの種類を識別するようにしたため、インクカートリッジの誤装着後における不適切な印刷を未然に防止することができるようになる。そして、インクカートリッジの装着の有無を識別させることにより、インクカートリッジが装着されたか否かと、適切なインクカートリッジが装着されたか否かとを同時に識別することが可能となり、装置全体の構成を効率化させることができる。

【００６７】

【発明の効果】以上詳述したように、本発明によれば、インクカートリッジに、取付位置に応じてインクの種類が電気的に識別されるようにした識別手段を設けたことにより、容易にインクカートリッジの誤装着の識別が可能で、かつ、構成部品の共通化を図り低廉化を推進した、構成の簡易なインクカートリッジを提供することができる。

【００６８】また、インクジェット式記録装置に、インクカートリッジに設けられた識別手段の取付位置から、装着されたインクカートリッジのインクの種類を判別する判別手段を設けることにより、容易かつ確実にインクカートリッジの誤装着の識別が可能で、かつ、構成の簡易なインクジェット式記録装置を提供することができる。

【図面の簡単な説明】

【図１】インクジェット式記録装置の概略構成図。

【図２】インクジェット式記録装置の制御機構を示す概略図。

【図３】インクカートリッジの斜視図。

【図４】インクカートリッジの断面図。

【図５】回路基板の取付位置を示す各インクカートリッジの斜視図。

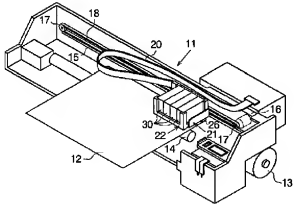
【図６】インクカートリッジホルダの斜視図。

【図７】インクカートリッジホルダにおける装着状態を示すインクカートリッジの断面図。

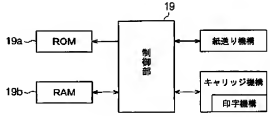
【符号の説明】

１１…インクジェット式記録装置
１９…判別手段としての制御部
３０…インクカートリッジ
３１…ケースとしてのインクカートリッジケース
３６…取付手段としてのピン
３９…識別手段としての回路基板

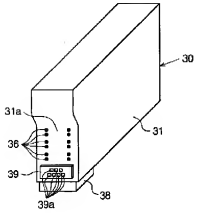
【図１】



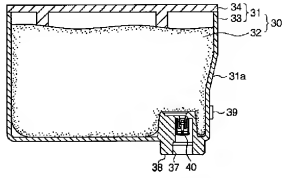
【図２】



【図３】


30
31a
31
36
39
39a
38

【図４】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32
31a
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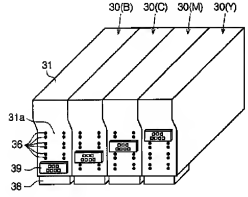
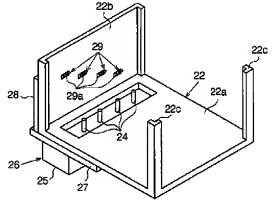
【図５】


30(B)
30(C)
30(M)
30(Y)
31
31a
36
39
38

【図６】


22b
29
22c
28
29a
22
22a
22c
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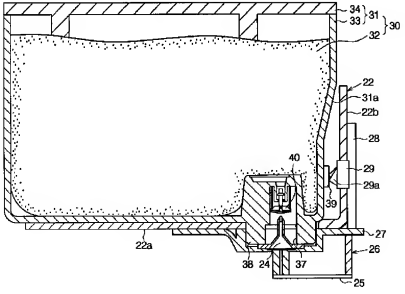
26
25
27

【図７】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29a
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